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ORIGINAL ARTICLES.

A CONVENIENT OPHTHALMOSCOPE.

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So many ophthalmoscopes have been invented that it would seem unnecessary or impossible to add to the number. But as most are new only in modification of some detail, so is the one here described. It is however so much more compact than any other ophthalmoscope with which the refraction can be determined with even moderate exactness; and during the five or six years that I have carried the one which I have, the convenience proved so great, as to warrant some mention being made of it.

It is safe to say that every one who has to make examinations of the eyes carries habitually in his vest pocket a convex lens. Whether he expects to make a professional call or not, that convex lens is always in its place. When going purposely to see patients he takes with him an ophthalmoscope, but as the case is usually large, and he is so constantly aware then of having the pocket uncomfortably full, that when not actually re-

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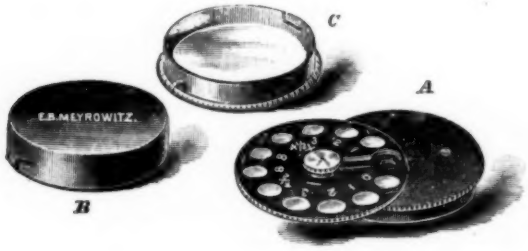
quired, the ophthalmoscope is left at home. But unfortunately it is frequently necessary to make ophthalmoscopic examinations which are unexpected, and therefore it occurred to me if an instrument could be so constructed as to be hardly more cumbersome than a convex lens, it would add to the convenience in constantly carrying it, and therefore to its efficiency. This is the object of the instrument.



The mirror (A, here represented with the face down) is about twenty-eight millimeters in diameter, of the ordinary concave form and focal distance, mounted in a ring about five millimeters wide. Behind this, there is a revolving disk containing five plus and five minus glasses, with one opening—being about such a disk as we find on the Knapp's ophthalmoscope. The only peculiarity of this disk consists in the fact that a slot extends from its center almost to the periphery, and the screw which usually holds the disk at its center, is enlarged flattened and has a bevelled edge so that it can be turned easily, with the fingers. When the ophthalmoscope is in use, this thumb screw holds the disk so that its center is near the circumference of the mirror, and the refraction lenses in revolving about the screw, come in turn behind the center of the mirror just as with the ordinary ophthalmoscope. When however it is desired to make the instrument smaller, it is only necessary to loosen that thumb screw of the disk, and sliding the disk through the slot onto the back of the mirror, it remains there, and we have simply this thickness of about a millimeter to add to the mounting of the mirror.

The convex lens (C) is mounted with a rim about 6 millimeters in width which fits over the rim of the mirror, and is held in place by a bayonet catch. Finally in order to protect the small refraction lenses it is well to have a cap (B) fit over them. This also has a thin rim about 8 millimeters wide, with a bayonet socket fitting over the rim of the lens. This cap while convenient is by no means necessary and adds to the weight. Thus the instrument is simple, compact and as useful as the ordinary refraction ophthalmoscope. When required for use the convex lens for the inverted image is removed, the screw behind the mirror loosened, and the disk, being slipped through the slot into its place the instrument is ready for use. An objection might be made that it has no handle. For a student this is possibly a slight inconvenience, but any one practiced in the use of the ophthalmoscope finds at the first trial that this one can be held before the eye with perfect ease, and the absence of the handle is not noticed even when making examinations with the upright image. The fact that the instrument has proved so very convenient and useful during a number of years, warrants, I think, this brief discription of it.

TRANLATONS.

OBJECTIVE METHOD OF DIAGNOSIS IN PARESIS OF OCULAR MUSCLES.

BY ALLVAR GULLSTRAND, M.D.

Translated by J. B. Story, M.D., for Ophthalmic Review from the Swedish Academy.

This paper describes a purely objective method for the diagnosis of paresis of the ocular muscles. Up till now the differential diagnosis of these affections has depended almost entirely upon the subjective method based upon the character of the diplopia, and it needs no argument to demonstrate how tedious, troublesome, and uncertain this method is in many cases, and how impossible to satisfactorily work with in some.

Gullstrand's method consists in a systematic comparison of the corneal reflections, as seen in the pupils when the eyes are rotated in the various meridians of the fields of fixation. The corneal reflection above is the same object as has been used by different observers in estimating the amount of strabismus (*vide* Priestley Smith's paper, O. R., Vol. VII., p. 349). The author devotes considerable space to showing that the relative position of these two objects, the corneal reflex and the pupil respectively, is a sound and satisfactory test of the movements of the eyeballs. It is well known that a corneal reflex changes its position in the pupil when the eye moves, and the reason that it does so is that the two objects, reflex and pupil, lie at different levels in the eyeball. If we assume that the corneal reflex lies on the line joining the eye observing and the eye

observed, it must be on the line drawn from the observing eye to the centre of curvature of the observed cornea; so that we may assert, as a general principle, that when the reflex lies on the observer's visual line, the position of the visible corneal reflex in movements of the observed eye coincides with the centre of its corneal curvature. By which is meant not that the reflex actually lies at that point, but that its apparent position alters in movements of the globe as if it were situated at that point. This general principle, however, can only be applied to the reflex from the portion of the cornea near its centre, as it is only in that region that its curvature approximates closely enough to that of a sphere.

The object whose position is compared with that of the corneal reflex is the centre of the pupil, which, owing to the refraction of the aqueous and cornea, appears to lie about 3.26 mm. behind the cornea. This is strictly true only, when the line, which passes through the centre of the pupil, coincides with the observer's visual line, as spherical aberration affects the calculation in other positions. We have then two objects to compare: the corneal reflex, whose apparent position is at the centre of the corneal curvature, or 7.8 mm. behind the cornea; and the centre of the pupil, which is 3.26 mm. behind the cornea, or about 4.5 mm. in front of the former.

It may therefore be laid down that when the corneal reflex lies on the observer's visual line, its position in a small-sized pupil changes on movement of the observed eye as if the pupil had made an equal angular movement round the corneal reflex as centre at a distance of 4.5 mm. as radius. If the movement of the eye is defective in any given direction (paresis or paralysis), the reflex does not change its position in the pupil as it does in a normally-moving eye, and it appears displaced toward the side of the defect—viz., toward the affected muscle—just as the false image in diplopia is displaced. This displacement affords an objective test of paralysis of a muscle, which supplements, or rather renders unnecessary, the usual subjective test of diplopia.

Two objections may be raised: firstly, that the method is

not sufficiently delicate to detect small defects in ocular movements, those, in fact, which produce the most distressing diplopia; and, secondly, that it cannot help in those cases where the oblique position of the double images is a material point in forming a diagnosis. As regards the latter objection, Gullstrand asserts that the obliquity of the double images is not a necessary observation in the diagnosis of uncomplicated cases, as the diagnosis can be made easily without regarding it, and in presence of the least complication the obliquity fails to afford the information we desire. It cannot be observed sometimes in cases where it should be manifest, and it is present in others where it should be absent—for instance, in paralysis of the external rectus.

In testing by the objective method, we must not restrict ourselves to observations of defective movements, starting from the primary position only. As the objective method takes no account of rotations of the globe round the optic axis, it is necessary to place the eye in such a position that the superior and inferior recti and the obliques can only act as elevators of depressors of the corneal centre. This is, of course, effected by abduction and adduction respectively. In abduction the superior and inferior recti can only elevate or depress the corneal centre, and in adduction the obliques perform this office.

It is always best to have the observer's eye, the luminous object, and the patient's fixation-point stationary, and let the movements be affected by rotation of the patient's head. A window can be used as luminous object, or a white card with a central perforation, as in keratoscopy, or a laryngoscopic mirror (the ophthalmoscopic mirrors are not large enough to produce a reflex image on both corneæ at once), but the two eyes (observed and observing), the fixation-point, and the source of light should, so far as possible, be in the same straight line.

Gullstrand prefers the window as object for reflection, and proceeds as follows: The patient is placed so far from the window that the corneal image is seen within a moderately

contracted pupil. The observer first determines the presence of binocular fixation, and then alters his position until the reflexes are seen symmetrically in the two pupils. The absence of binocular fixation may at once enable the diagnosis to be made, but further examination is always desirable, and often absolutely necessary. Usually four movements are sufficient, bending forward and backward, and turning the head to the right and to the left; but if the case is complicated, the diagonal positions must also be investigated. Although it seems hardly necessary in an ophthalmic periodical, it may be well to produce Gullstrand's complete list of defective movements and their respective causes.

A. Horizontal asymmetry, on looking to the right shows lesion of a muscle turning the eyes to the right.

1. The reflex in right pupil deflected to the right (or in the left to the left) shows lesion of right external rectus (or weakness of the muscle in fixation with right eye, and secondary deviation of the left eye).

2. The reflex in the left pupil deflected to the right (or in the right to the left) shows lesion of left internal rectus (or weakness of that muscle in fixation with the left eye, and secondary deviation of right eye).

B. Horizontal asymmetry, on looking to the left shows lesion of a muscle turning the eyes to the left.

1. The reflex in left pupil deflected to the left (or in right to the right) shows paresis of left external rectus (or weakness of that muscle in fixation with left eye, and secondary deviation of right eye).

2. The reflex in right pupil deflected to the left (or in the left to the right) shows lesion of right internal rectus (or weakness of that muscle in fixation with right eye, and secondary deviation of left eye).

C. Vertical asymmetry, on looking upward shows lesion of some one of the elevating muscles.

1. The reflex is higher in right pupil.

a. Looking to the right side shows lesion of right superior rectus.

b. Looking to the left shows lesion of right inferior oblique.

2. The reflex is higher in left pupil.

a. Looking to the left shows lesion of left superior rectus.

b. Looking to the right lesion of left inferior oblique.

D. Vertical asymmetry, on looking downward, shows lesion of a depressor muscle.

1. Reflex lower in right pupil.

a. Looking to the right shows lesion of right inferior rectus.

b. Looking to the left shows lesion of right superior oblique.

2. The reflex is lower in left pupil.

a. Looking to the left shows lesion of left inferior rectus.

b. Looking to the right shows lesion of left superior oblique.

This simple test is sufficient to differentiate paralysis of any one single muscle, and even more complicated lesions—for instance, if two associated lateral muscles are affected, the reflex will be deflected toward the affected side in both pupils in movements in that direction. Again, as symptoms of lesions in lateral muscles are only present in horizontal movements and of elevators or depressors in vertical movements, the lesions of one group can be distinguished from those of the other, even when both groups are affected.

It is only when, by complete paralysis of one lateral muscle, movement in that direction is absolutely impossible, that difficulty is experienced. But suppose, with complete paralysis of the right external rectus, an elevator is also paralyzed on that side. If the vertical deflection of the reflex is seen on looking to the left, the inferior oblique must be the muscle affected; if it is not seen, then the superior rectus is affected. If both lateral muscles of the eye are completely paralyzed, the lesion of an elevator will deflect the reflex either upward and inward, or upward and outward. In the first case the affected muscle is the superior rectus, in the second the inferior oblique.

Certain combinations of elevator and depressor lesions necessitate testing in the diagonal positions. Suppose horizontal movement normal, and reflex in right pupil deflected upward on looking upward, and downward on looking downward. Then there is a lesion of both an elevator and a depressor, and

the muscles are antagonists—either the two recti or the two obliques. If the deflection exists on looking to the right, and then raising or lowering the eyes, the recti are affected—if, on the contrary, it shows itself on looking to the left and raising or lowering the eyes, the obliques are affected.

Further still more complicated cases are discussed with a view to showing the utility of the objective test.

One marked advantage of the method is that its results can be shown photographically, and Gullstrand's paper concludes with twenty-nine excellent photolithographs of actual cases, of which he gives a detailed description in the text. The plates are quite sufficient vindication of the method against the first of the two objections mentioned above.

SELECTIONS.

EYE-STRAIN AND ITS RELATIONS TO "CEREBRAL HYPERÆMIA," ETC.[1]

BY E. C. SEGUIN, M.D.

Eye-strain, more especially that due to paresis or original weakness of the third and sixth cerebral nerves, produces many symptoms besides cephalalgia and migraine which have lately received so much intelligent attention. The symptoms to which I refer are fully as important as cephalalgia and migraine, but have been generally, if not universally, misunderstood because practitioners have blindly followed the theoretical teachings of certain authorities.

The chief of these symptoms are: Occipital, suboccipital, and occipito-cervical pain and distress; a sense of stiffness in the occipito-cervical region ("at the base of the brain," as is commonly said); feelings of fullness, pressure, or lightness in the head; sensations of numbness or of formication in the scalp; varying degrees and forms of dizziness (but not true vertigo[2]); inability to read, write, sew, converse, sit at table, to go on the street or into rooms, and even to "think," without supervention or aggravation of symptoms; fear of certain

[1] A supplement to Lectures on some Points in the Treatment and Management of Neuroses, which appeared in the *Journal* in April and May, 1890. Lecture I. Written at Florence in January, 1890, for a German edition of the Lectures (G. Thieme, Leipsic, 1892).

[2] Aural or labyrinthine vertigo and vertigo from evident or latent diplopia are, of course, excluded. In such cases true vertigo (subjective whirling or turning) exists, and often no other cerebral symptoms are present.

places; insomnia; emotional attacks; pains (differing from migraine) in various parts of the head; and, later, also the multiple symptoms termed neurasthenia. Individual patients describe these subjective symptoms somewhat differently, according to their ability of observation and their facility of expression.

The above-mentioned symptoms, variously grouped and sometimes combined with others, have been appropriated by the advocates of a fanciful vaso-motor pathology; and such wholly theoretical "diseases" as "*cerebral hyperæmia*" (Hammond) and "*congestion of the base of the brain*" (Brown-Séquard) have been accepted by the profession with but too little open criticism, and multitudes of patients have bee treated by remedies *deductively* considered as useful, such as the actual cautery, cups, and blisters to the neck, the ice-bag to the head and spine; internally, ergot, the bromides in full doses, bella-donna, and (contrary to the theory, but found useful in practice) strychnine. Such cases have never been cured, I believe, by these means alone, though often relief has been obtained by the analgesic effects of the remedies and by the *suggestion* of the confident specialist.

I have never recognized these so-called "diseases," but have always recorded and spoken of the symptoms as paræsthesiæ of the head (*cephalic paræsthesiæ*), awaiting the time when experience might lead to their more correct interpetration.

To be brief, I now believe that I can offer a preliminary partial grouping of these symptoms according to their pathogenesis, not by any means a perfect scheme, but one which may serve as a basis for further and more minute observation and better classificatian.

1. The majority of cases presenting such symptoms are, I think, cases of eye-strain: exhaustion and hyperæsthesia resulting from the persistent use of weak neuro-muscular organs, more especially the third and sixth nerve apparatuses. Errors of refraction seem to play but a secondary part in the genesis of the symytoms, whereas they are very important in cases of cephalalgia and migraine. Most of all, suboccipital pain and

distress (the chief symptoms of "congestion of the base of the brain") are due to defective power of convergence and accommodation. Not rarely, in all categories, the symptoms appear within a short time or suddenly, after years of apparently easy use of the eyes. This sudden onset may often be traced to the action of some debilitating influence, such as an attack of acute disease, to over-use of the eyes, etc.; and it often coincides with the "failure of accommodation," normal or premature. In other words, the strain and fatigue resulting from the use of weak eyes are often long compensated or rendered latent by perfect health.

2. Some cases (my experience does not enable me to state a proportion) of cephalic paræsthesiæ are due to dyscrasic conditions, more especially lithæmia, oxaluria, latent gout—in general tones, to conditions of suboxidation. The early stage of cirrhosis of the kidneys is sometimes characterized by these symptoms and obstinate headache, and in these cases the arterial tension is persistently high, the urine is overabundant, of low gravity, contains hyaline casts with or without albumin; attacks of convulsions and of slight hemiplegia are not rare.

3. Such symptoms as lightness in the head, pressure in any direction (I do not believe that the *direction* of the pressure, a purely subjective interpetration by the patient, has any meaning in the present state of our knowledge), and deficiency in power of attention, memory, etc., may undoubtedly be caused by anæmia of the brain from general anæmia or through valvular cardiac disease, feeble heart, etc.

4. It is also possible that occasionally these symptoms indicate the beginning of organic cerebral disease, but at present we can not feel sure of this in a given case.

5. Probably cephalic paræsthesiæ are developed by the action of peripheral—*i. e.*, extra-cerebral—lesions, as in some cases of "spinal irritation," etc.

The chief purpose of this note is, however, to endeavor to advance the problem, as presented in group 1, one step further, and to state (from observed facts only), which of the above-mentioned symptoms may be caused by paresis of the third

nerves and their muscles, and which by paresis o the sixth nerves and their muscles, apart from the element of refraction, which is also important.

The necessity of stating my views in so small a compass must be the excuse for the following condensed summary of two symptom groups which deserve ample treatment:

A. Symptoms of Paresis (Insufficiency) of the Third Cerebral Nerves and Attached Muscles.—Occipito-cervical pain and "distress" are the characteristic symptoms, sometimes the only ones. The pain, diurnal as a rule, and often not appearing until the patient has used his eyes in dressing, eating, or reading, is usually greatest between the occipital bone and the second vertebra, though it often extends from the upper part of the occiput to the fourth or even the sixth vertebra. It is sometimes more a "distress" than a true pain, and is often accompanied by sensations of stiffness and tightness ("as if a hand grasped the neck"). There is never, strictly speaking, neuralgia of the occipital nerves, or objective rigidity as in beginning caries. Tenderness is rarely found, though in women spinal hyperæsthesia (so-called spinal irritation) often coincides. Frequently there is a sensation of weight or downward pressure on the back part of the head, with (usually) intermittent numbness (a "dead" or "wooden" feeling) and formication. In some cases the fullness or tightness (cincture or cap feeling) extends to the whole head.

Apparent loss of power of attention and concentration (volition) is much complained of, even to a degree simulating mental failure.[3] Reading, writing, sewing, piano practice, conversation, even eating, are painful or unbearable; in other words, the symptoms are increased by an act requiring convergence and accommodation. It is sometimes said by patients, in objection to the suggestion of eye-strain, that the symptoms appear or are increased by "simply thinking"; but this statement involves ignorance of the psychological fact (or

[3]Some cases of "breaking down" at school from "overwork" belong to this category.

law) that in thinking, giving attention, concentrating our mind, and in willing—in all such apparently purely psych c acts—we unconsciously send out motor impulses to the ocular apparatus chiefly, but also to many other muscular groups. Any one can, by a few moments' study of himself, verify the truth of this statement that giving attention or willing usually includes external muscular activity (unconsciousness, as a rule). Thus eye-strain occurrs in persons who do not mean to use their defective eyes.

The prolonged duration of these symptoms, or rather of the strain, may lead to neurasthenia, insomnia, and a curious mixture of hysteria and hypochondria, so that the diagnosis becomes more obscure.

Headache is not rare, but in such cases there are also usually faults in refraction or other factors. Simple asthenopia, sense of fatigue, or pain in the eyes, orbits, brow, or temples, is only occasional, and seldom a prominent symptom. Usually the patient pretends to have strong eyes.

B. Symptoms of Paresis (Insufficiency) of the Sixth Cerebral Nerves and Attacked Muscles.—In contrast with the symptoms of insufficiency of the third nerve apparatus, the symptoms of this condition are diffused, variable, and less definite. Perhaps the most prominent is dizziness, or "vertigo," as stated by the patient. But close questioning shows that this is not a true vertigo, but a sense of unsteadiness, of uncertainty of equilibrium, of confusion, clearly referred to the head. Allied to this is nearly always a sense of indefinite fear. At times the dizziness is so grear as to oblige the patient to keep his room and to give up all ordinary duties and relations. Going out upon the street or entering rooms filled with people intensifies the feeling to an insupportable degree, and the patient needs the moral or physical support of another person.

Various and peculiar sensations are felt in the head—such as a sense of fullness, "as if the head would burst"; a downward pressure on the head, diffused or localized, "as if a stone or a sharp stick" passed on it; a sense of constriction, general or cincture-like; pain in various areas of the scalp; occasional

feelings of numbness (a "dead" or "wooden" feeling), or of formication or wormlike crawling, also variously distributed; a quasi tinnitus or noise in the head (not in the ears) is not rare.

As these paræsthesiæ are increased by the sight of moving objects in a small or large space (on the street, where machinery is in motion, or where a number of people are moving), we often meet with conditions like those termed agoraphobia and claustrophobia; and I am confident that many cases recorded under these titles have really been cases of eye-strain. However, I admit that there are such cases which depend upon more general pathological conditions. I should add that the movements necessary to make the examination of the eyes of these patients fatigue them very much, even the simplest test of the recti muscles by the index finger causing distress. Hence examinations should be made slowly and in several *séances*.

Apparent loss of mental power is perhaps more marked a feature of these cases than of those of category *A*. The patient can do things fairly well all alone in the quietude of his room, but in his relations with the world he seems to lose all self-control and power of attention and concentration. In consequence of the distress attending going out upon the street and meeting other persons, such a degree of emotional disturbance (loss of self-control) is developed that the patient is said to be hysterical. His symptoms absorb his attention so much that he often is called hypochondriacal as well.

Insomnia and neurasthenia are results of long-continued eye-strain in this category as in the first—perhaps more. It is in these later stages of the affection that the diagnosis becomes obscure, and can only be determined by prolonged observation and by trial of treatment. For it is not easy to say at once, in a case presenting symptoms of neurasthenia and hysteria (perhaps also "spinal irritation"), together with defective eyes, which of the conditions is primary and pathogenetic. The relation of cause and effect is doubtless in either direction in different cases, and it will be for future observation to give us the

elements for judging this important question more quickly and positively.

In the few cases which I have seen in which all the ocular muscles were paretic, the (multiple) symptoms were more like those of category *B*.

It may be said that there is a certain overlapping of semeiology in this sketch of the two symptom groups. This is true, but I believe that further study will make the distinction more complete, though it must be remembered that these overlappings appear in nearly all symptom groups which we attempt to represent as "diseases." This note is suggestive only, and I do not pretend to state more than the main outlines of the question.

It is probable that a special grouping of symptoms will be found to be due to "spasm of accommodation," which so often complicates errors of refraction. I have not the data for any suggestion in this direction, except to say that headache and migraine will be found prominent.

Diagnosis by Manipulation.—It is out of my province to speak of the ophthalmic examination necessary in all such cases; but I desire to call attention to the facts that the simple test of convergence, by approximating a small object to the patient's nose, increases the suffering of subjects of the first category, while those of the second category experience great distress when made to look outward or around without moving the head, or if a bright object is moved circularly, or a wheel rotated before them. Complete atropinization gives these last patients great relief.

Diagnosis by Drugs.—In the present state of medicine this is occasionally a final resort. We employ it in supposed malarious and syphilitic cases, even while remembering that quinine does cure some non-malarious conditions, and that mercury and iodide of potassium are occasionally efficacious where syphilis is out of the question. A trial by bromide treatment often enables us to correctly judge cases in which hysterical and epileptic symptoms are conjoined. In cases of eye-strain, experience has taught me that cases of the first

category (third-nerve paresis) are relieved by nux vomica or strychnine, and are aggravated by belladonna and other mydriatics; whereas, on the contrary, the last-named remedies give relief to cases of the second category (sixth-nerve paresis), and strychnine makes them worse. In some uncomplicated cases of paresis of the third nerves (insufficiency of the recti interni or of the ciliary muscle) an apparent cure is obtained by a progressive course of strychnine.

I cannot in this note refer *in extenso* to the treatment of all such cases, but will simply repeat what is stated in the text of the *Lectures*—viz., that, apart from the adaptation of proper glasses and prisms, in some cases the use of partial or total tenotomy or myotomy, which are all of the utmost importance, the scientific treatment consists in the internal use of nux vomica, strychnine, and nerve tonics generally in cases of category *A*, and of cannabis Indica, belladonna, atropine, conium, the bromides, antipyrine, etc., for cases of category *B*. Of course, in cases of both categories, rest, much more complete than is usually prescribed (even ocular rest by prolonged atropinization), and a general restorative treatment are necessary. Change of scene and travel are useful, but should never be prescribed until all the visual defects have been corrected and convalescence is evident. Work should not be resumed except with the aid of the most appropriate optical correction, and by degrees. It must be added that there are eyes which can not be "corrected" with our present appliances, and in such cases the prognosis is bad, although temporary improvement may be obtained by proper medicinal and hygienic treatment. I would, lastly, suggest that tobacco is particularly injurious to persons whose third nerves are weak.—*New York Medical Journal.*

PLICA CIRCULARIS CONJUNCTIVÆ IN THE NEGRO.

BY MIDDLETON MICHEL, M. D.,

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Many years ago I noticed a singular distribution of the ocular conjunctiva in a negro child, and, having found the same condition in other children of the same race on several subsequent occasions, I was lead to make some comments on the subject at a meeting of our medical society some time in 1880.

I had met this peculiarity only in negro children, except once in an adult negro whose eyes were so from childhood. At that time, as now, I thought that this was an anatomic arrangement of the conjunctiva more frequent, perhaps, in the negro, as I have not seen it in the white race, although I supposed it occurred in the latter, since Desmarres describes a somewhat similar condition witnessed on more than one occasion at his clinics in Paris. Desmarres proved to be the only author among the many then consulted who referred to anything of the kind, and he regarded it as a perikeratitie hypertrophy of the conjunctiva.[1]

Further inquiry among authorities at hand revealed the existence of a very rare disease of the eyes during spring and summer months, which had but recently attracted the attention of European oculists, some of whom regarded it as a veritable spring catarrh.

Hunter appears to have been the first to give a full and accurate account of this disease, in 1879; though Arlt[2] seems to have noticed it earlier and to have written concerning it in 1851.

Subsequently an interesting description of this complaint is recorded by Dr. Swan M. Burnett, who refers particularly to its occurence among negroes. All of these and other writers, however, speak of a disease of the eyes not limited to any one part of the mucous membrane, but invading all portions of the conjunctiva of either one or both eyes, and especially conspicuous in the palpebral part of its course, characterized by nodules, excrescences, or papillary elevations of variable size. Such importance, indeed, is attached to the blepharitic condition that some have considered this the pathognomonic symptom, differentiating the disease from trachoma by the flatness and other features of these granulations.[1] All refer to a disease. Arlt indorses this view and considers it a scrofulous conjunctivitis that manifests itself especially among children between the ages of ten and fifteen years; but he remarks that it makes its appearance without previous inflammation, and so far resembles a simple hypertrophy in parts of the mucous membrane about the cornea; that his early acquaintance with the affection was in a little patient sent him by a colleague with the request that he would operate upon the eyes supposed to be affected with pterygia. Burnett writes also of a "circumcorneal hypertrophy of the conjunctiva," giving the same apellation as Desmarres, but stating that everything warrants the affection to be classed among the "conjunctivitides."

Personal research, on the contrary, and consideration of the rare instances that have come under my observation since 1876, force me to announce in this paper a congenital not an acquired or pathologic state of the adnata; having nothing to do with vernal conjunctivitis—*conjunctivite printaniere* of De Wecker—or spring catarrh of the conjunctiva.

In my experience these accidental occurrences came in both eyes of negro children, at distant intervals, without reference to seasons of the year, and were of such a nature as to arrest my attention at once as something with which I was unaquainted. The impression at first conveyed was that of a singular development of perfectly symmetrical pterygia, of a dark color, surrounding both corneæ, giving a striking appearance and con-

veying an indiscribable expression to the child. No pain, no iritic or sclero-corneal vascularity, no lachrymation, nothing indicative of inflammation was present; there was some little irritation, perhaps, but not more than would be produced by the friction of any thickened pterygium with the periodic movements of the lids.

Closer inspection discovered both corneæ buried within a rim-like encasement, produced by the infolding of the conjunctiva symmetrically around their margins to the distance of about an eighth of an inch, the accurately defined limitations ot which were better marked by a deep pigmentation of the reduplicated conjunctival fold, such a coloration as is not uncommon about this membrane in negroes, but which was here confined to this plica circularis alone. This marginal hem of conjunctival tissue seemed borrowed in part from the bulbar portion, though principally made up of the attenuated sclero-corneal or almost epithelial portion; and this fold, quite detached and easily raised with a probe all around the cornea, was slightly elevated by an exudation through its layers so as to assume a gelatinous appearance. No trace of ulceration or phlyctenulæ could be discovered, and no leashes of blood-vessel were visible anywhere running into this mucous zone. The curious fact that Graefe[1] has written of what he terms a "gallertige infiltration," that is a jelly-like infiltration about the limbus, convinces me that so high an authority also noticed this peculiarity which he, I believe, never associated, any more than did Desmarres, with any particular disease.

With the exception, then, of Desmarres, Graefe, perhaps Arlt, and recently Bronner,[2] who respectively refer to a strange adjustment of the adnata at the corneal attachment, and to its hypertrophied aspect, the only approach which others make toward the recognition of a similar distribution of the conjunctiva herein described among negroes is the mention of a partial thickening that sometimes results from a periodic summer disease of a markedly scrofulous and catarrhal type occurring and disappearing with the disease, but which does not by any means invariably include the entire circumference of the cornea.

Emphasis should be placed upon this special circumferential fold, as this feature is obviously more or less conspicuous in the accounts given by the few authorities recognizing this phase of the subject. The perfect symmetry of this overlapping fold of equal width around the cornea of both eyes appears to me inconsistent with the idea of its origin from previous inflammation, ulceration, or disease of this membrane. The history of the formation of a pterygium and of the degenerative changes consequent upon attacks of recurring conjunctivitis call to mind the irregular and eccentric folds into which the mucous membrane is thrown aud puckered under such circumstances. After abrasions or even slight loss of epithelium about the region of the limbus, the swollen conjunctiva reaches the denuded surfaces, becomes agglutinated, and finally adherent, cicatricial contractions establishing a tucked fold of greater or less peripheral extent about the cornea with such vascularity as to indicate its traumatic origin; the radiating lines of traction toward the corneal attachment imparting the characteristic triangular shape to the pterygium, which, from the very nature of the the tissues implicated, rarely occupies more than a very limited portion of the limbus, but never travels entirely around the bordered region in one symmetrical, regular, continuous fold of perfectly healthy tissue of the same width throughout.

Herpetic or phlyctaenular ulcerations,and particularly multiple syphilitic gummata, with their nodules running confluently one into another in a thickened border line about the cornea, might easily impose a similar aspect, but the immobility of indurated, cicatricial, and adherent tissue, with well-marked traces of previous disease, are always present to exclude any misapprehension.

Regarded by some again as a simple hypertrophy of the membrane—the view which Desmarres evidently takes of the subject—it may be inquired whether this condition was considered as the result of previous inflammations or not. Now, hypertrophy of a mucous membrane consists of an increase of its structural elements, the nutritive material for which is imported into the region by a liberal blood-supply; but just here

in this locality the conjunctiva has parted with all or its histologic elements save its protective or epithelial layer, which remains alone to extend itself like the thinnest possible araneous structure over the cornea. Any hypertrophy about the limbus could consist of a hypertrophy of epithelia only, and, however great this epithelial proliferation might be, it would scarcely constitute the increased thickness, and anatomic folding-in of the layers such as has been described, and certainly would not be regarded as a true hypertrophy of the mucous tissue as such; nor would this be productive of exactly the appearances we have noticed. It must be remembered in this connection, however, that hypertrophy may sometimes be congenital.

The striking pigmentation of this ring of movable and overlapping conjunctival tissue, in bold contrast with a clear and non-vascular ocular conjunctiva in the negro, formed another remarkable feature of these cases. Here again, in this vicinity we are not to look for a veritable secretion as we would elsewhere, for no secretory process is possible where the histologic structures, even as simple cells, are not present to produce it; this coloration seems rather to depend upon certain filtrates from the blood, escaping without rupture of any bloodvessels, but through simple pressure consequent upon the obstructed or impeded flow through this modification of the mucous membrane; the dark pigmentation represents such chemical changes as have readily converted these filtrates into pigments; through mechanical obstructions the hemoglobin escapes, permeates the part, and becomes converted into permanent pigment.

To the views herein expressed as to the anatomic nature and congenital character of this circumcorneal ring of mucous membrane the only avenue to adverse criticism would lie in the conjecture that I had overlooked a very important disease of the eye, designated by some writers as conjunctivitis æstivalis, or more likely that I have only seen a singular chronic variety of the affection supposed to have exhausted itself at the limbus alone. Would not, however, the annual recurrence of such a disease have very soon declared itself in unmistakable terms? —or even its occasional advent have rectified any possible or

probable misconception? Especially would this have been the case, as during the prevalence of the recent allotropic conditions of the oxygen of the air that have predisposed to every kind of irritation and inflammation of the sensorial and respiratory tracts, we have all been vigilant of any epidemic or endemic cause engendering disease. Again, would not the palpebral variety of the disease, so dwelt upon by those who have accurately described it, have unavoidably intruded itself upon my observation, more particularly from its supposed resemblance to *trachoma*, which latter affection is so rare in negroes that many consider this race as almost exempted.

The absence, then, of all catarrhal symptoms, and the exceptional peculiarity of so precise and equable a perikeratitic fold of highly pigmented movable membrane, presenting a like arrangement in both eyes, and seen in negroes alone, are circumstances that seem to indicate a congenital disposition of the conjunctiva, very frequent, at least, in the negro, and similar to the plica semilunaris and membrana nictitans, of which the former is but a vestige.

Until further developments respecting this subject I am disposed to consider this a description of an anatomic feature observed in the eyes of our negro population particularly, which should be termed the plica circularis.—*Med. News.*

THE TREATMENT OF HYPOPYON KERATITIS.

BY G. E. DE SCHWEINITZ, M.D.

The term purulent keratitis describes in a general way the forms of inflammation of the cornea associated with the development of pus, either within the layers of the cornea or in the anterior chamber. It is typified by the disease which has been variously called abscess of the cornea, hypopyon keratitis, and serpiginous or creeping ulcer. The serious nature of the affection, the scarring of the cornea which practically always follows it, the disfiguring staphylomatous protrusion which may ensue, and the actual blindness which is only too frequently the result of it, furnish sufficient reasons for the most attentive treatment, and if any new method, or new method of applying old measures, gives evidence of producing better results than those which have been previously employed, we necessarily turn to it. For this reason the paper of Fukala (*Berliner Klinische Wochenschrift*, December 5, 1892), entitled "A New Method of Treating Abscess of the Cornea," is worthy of review.

Two evident indications for the treatment of abscess of the cornea are to prevent the bulging of this structure at the point of the lesion and to evacuate the pus, either for the layers of the cornea or from the anterior chamber, or from both places. The tendency to protrusion of the affected tissue is brought about partly by the fact that the walls no longer resist the intraocular tension so well as they did before they were attacked with the disease, and partly by the fact that the pus burrows, or at least spreads, in the lamellæ of the cornea and lifts them from the surrounding more healthy tissue, very much as the same process takes place in an abscess in the subcutaneous

tissue where the gradual accumulation of pus and its infiltration along the lines of least resistance raise the superficial tissues above their surrounding level. With these two indications in view, and influenced by the facts which have just been recited, Fukala believes that the treatment of hypopyon keratitis, or, as he calls it, abscess of the cornea, should consist in methods which are calculated to change the entire abscess into an open ulceration, to which the stimulus to cicatrization has been given.

This he accomplishes in the following manner: The conjunctival cul-de-sac is carefully irrigated with a 1 to 5000 sublimate solution, after the eye has been rendered anæsthetic with a few drops of a five per cent solution of hydrochlorate of cocaine. The superficial portion of the lesion is seized with a pair of fine forceps (iris forceps), and removed by means of the iris scissors. Very often the forceps are unnecessary, the scissors being all-sufficient. The important point is that all of the necrotic tissue shall be removed to the extreme periphery of the lesion in its entire circumference. Afterward the open wound is sprinkled with the sublimate lotion, atropine is instilled, and a pressure bandage is applied. The open wound which resultt from this procedure, according to the author, is speedily cicatrized by the process of granulation. In the cases which are quoted in support of this, two in number, the result appears to have been prompt and satisfactory.

It is difficult to understand why the author of this paper refers to the method which he employs as a new one, as the removal of necrotic tissue from a sloughing ulcer of the cornea by some means or other, although perhaps not necessarily with an iris forceps and iris scissors, is a very well recognized surgical procedure. It serves, however, as an introduction to what are the best means of treating these serious forms of corneal ulceration. Sæmisch's section, once so popular and, when successfully performed, capable of yielding the very best results, has not found in recent times the favor which it once enjoyed, largely, perhaps, because other methods—for example, the actual cautery—have secured equally good results,

and have been unattended with many of the dangers which encompass it, chief among which is prolapse of the iris into the lips of the wound. It would be useless to urge at this late date the claims of the actual cautery in the treatment of infective corneal ulceration. These are so well established as to require no further commendation; and Fukala, impressed with the value of his own method of treating this disease, brings forward as its chief endorsement that in his hands it has yielded as good results as has the actual cautery.

There are, however, cases in which a very large ulcer is associated with a hypopyon that nearly fills the anterior chamber, and in which it can be demonstrated that the collection is exceedingly tenacious, having assumed the character of a slough. Under these circumstances there is a strong indication for Sacmisch's section, or, at least, for a section which in some way makes it possible to reach the material in the anterior chamber with forceps, or to afford a point of entrance for the tip of a delicate syringe, with which the anterior chamber may be irrigated. As Gruening long ago pointed out, it is not unlikely that in those cases a combination of Sæmisch's section and the actual cautery is preferable, because the latter destroys the septic material of the cornea and the former removes septic material from the anterior chamber.

The comparative value of incision and the galvano-cautery, as given in a table compiled by Nieden, is as follows: In 113 cases of incision there were 9.7 per cent of phthisis bulbi, 26.5 per cent of leucoma adhærens, 61 per cent of macula, and 3.5 per cent with unknown result; while in 100 cases treated with the galvano-cautery there were 0 per cent of phthisis, 3 per cent of adhærent leucoma, 9 per cent of leucoma, and 88 per cent of macula. It is, however, very difficult to obtain accurate comparative statistics on this point, and the treatment of each case must be governed by the existing conditions and cannot be decided on statistical information.

So far as Fukala's recommendation to remove the necrotic tissue and to convert the abscess into an open ulcer is concerned, it may be said that, independently of the fact that this

method, or one analogous to it, is well known and often practiced, there is reason to fear that the resulting scar may be more extensive than that which is caused by some other procedures. One of the objections urged against the galvano-cautery is the fear that it may lead to a very firm and extensive cicatrix. This objection does not seem to be well founded, and as Fuchs has stated, and as it has often been shown since, the opacity is not greater after the actual cautery has been used, it is applied properly and only within the area of necrotic tissue, than if it had not been used. The small circumscribed abscesses of the cornea, which really, by virtue of the fact that the superficial epitheluim has not broken, belong rather to the non-ulcerated lesions of the cornea, are very well treated by cutting with a delicate knife the superficial layers, and thus evacuating the pus, as is especially urged in a paper by Hansell; or, after incision of the superficial layers, the necrotic tissue may be touched with the point of a galvano-cautery or scraped away with a small curette, converting them, as Fukala would do with the larger ones, into an open ulcer.

After the ulcer has been thoroughly broken down by scraping its margins, the surface may be cauterized with a two per cent solution of nitrate of silver, which, in the opinion of many surgeons,—Berry, for instance,—is quite as efficacious as any other method. Fukala, after his operation, recommends sprinkling the surface of the ulcer with sublimate lotion; no doubt a very excellent precaution, and one tending to stimulate healing; but, on the whole, iodoform is the preferable drug. It is well borne by the cornea, has a distinct anæsthetic action, and in corneal tissue probably encourages the healing by granulation. The iodoform treatment alone, however. is hardly sufficient, and although the drug holds a justly high place in the treatment of corneal ulceration of the sloughing type, it has a good many failures to its credit, and statistics show that from six to seven per cent of shrunken eyeballs have resulted from depending alone upon the iodoform treatment of infective corneal ulcers.

It should not be forgotten that many of the cases of moder-

ate hypopyon keratitis do remarkably well without operative interference. Atropine or eserine, according to the indications, hot compresses, a compressing bandage, and irrigation of the lachrymal sac constitute measures which have yielded abundant success; in fact, one of the chief difficulties of telling exactly what is the most valuable form of treatment in any one particular type of corneal ulceration is, that it is so rare to employ the various measures unassociated; thus, the author whom we heve several times quoted, practicing the very rational and quite common procedure of removing the necrotic tissue in order to convert the slough into an open and healthy sore, follows his treatment by sublimate lotion, atropine, and a compressing bandage, and is rejoiced to find, in one instance at least, the disappearance of a small hypopyon in the course of twenty-four hours, a result which might have ensued without the operative interference. This combining of methods of treatment has been one of the chief difficulties in exactly determining the value of eserine in corneal ulceration. The miotic has been used with very good results, and in recent times it has seemed with better results than those obtained from mydriatics, but it has almost always been employed in association with other methods of treatment: hot compresses, bandages, antiseptic fluids, bracing constitutional treatment, and rest in bed.

The summary of the matter, so far as surgical procedures are concerned, would seem to be somewhat as follows: The actual cautery in medium-sized septic ulcers of the cornea with moderate degrees of hypopyon; Sæmisch's section, or a modification of this, in large infective ulcers with extensive hypopyon, composed of tenacious material resembling a slough; a combination of the galvano-cautery and corneal section in types of extensive ulceration and tenacious hypopyon, where there has been a particular tendency for the ulcer to spread and to resist treatment; some form of operation which removes the necrotic tissue in circumscribed abscesses of the cornea, or in small abscesses which have burst superficially and are beginning to infiltrate the lamellæ of the cor-

nea; and, finally, in any form of infective ulcer of the cornea, after removal of sloughing tissue by any of the recognized means, the direct application to the lesion of an antiseptic, and experience seems to show that iodoform is the one most generally applicable. In all of the instances quoted, if there is no contraindication, the compressing bandage assists in the cure, and, indeed, very likely is responsible for a great deal of it.—*Therapeutic Gazette.*

REVIEWS.

TEXT-BOOK OF OPHTHALMOLOGY. By Ernest Fuchs. Authorized Translation from the Second Enlarged and Improved German Edition by A. Duane, M.D. New York: Appleton & Co. 1892.

The American profession decidedly owes Dr. Duane sincere thanks for having translated the most excellent text-book of Fuchs, and having done it in such a perfect manner. As long as there are possibilities of doubt left, there will be two or more opinions about a given point and we can therefore expect in reading any such book to find opinions with which we differ. Such points are, however, few and far between in the text-book before us. Its clearness and preciseness of language is not its least recommendation.

ON THE PATHOLOGY AND TREATMENT OF GLAUCOMA. By Priestley Smith. With Sixty-four Illustrations. London: J. and A. Churchill, 11 New Burlington Street. 1891.

To the student of glaucoma this treatise full of well-executed drawings of experiments to explain the pathological conditions and of the pathological changes found in all forms of glaucoma, is of very great interest. To all those we highly recommend its perusal which will amply repay the time spent on it.

SPECTACLES AND EYEGLASSES, THEIR FORMS, MOUNTINGS AND PROPER ADJUSTMENT. By R. J. Phillips, M.D. With Forty-Seven Illustrations. Philadelphia: P. Blakiston, Son & Co., 1012 Walnut Street. 1892.

This neat little volume contains a great deal of useful information and useful hints for the adjustment of spectacle frames.

DISEASES OF THE EYE, EAR, THROAT AND NOSE. A Manual for for Students and Practitioners. By F. E. Miller, J. F. McEvoy and J. E. Weeks. Philadelphia: Lea Brothers & Co.

How a little quizz-compend can claim the title of a manual for the student and practitioner, we fail to see. Aside from this objection the well illustrated little volume, is probably the best quizz-compend, particularly the part on the eye, which we have become acquainted with.

HAND-BOOK FOR OPTICIANS. A Treatise on the Optical Trade and Its Mechanical Manipulations. By W. Bohne, Optician. Second Edition. Published by the author. No. 119 Canal Street, New Orleans, La. 1892.

The second edition of Mr. Bohne's book, is a great improvement on the first, and the author is to be commended for his zeal in the right direction. We are, however, sorry to see this boak burdened with chapters on matters totally foreign to the main object of the book. Particularly the chapters on anatomy of the eye, relief to injured eyes, and one or two others near the end of the volume, might with advantage have been left out.

PHYSICIANS' VISITING LIST. Philadelphia: P. Blakiston, Son & Co. 1893.

As useful as ever to the general practitioner.

ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES. Edited by Ch. E. Sajous, M.D., and Seventy Associate Editors. Philadelphia, New York and London: F. A. Davis. 1892.

This series is too well known by this time to need any special recommendation. Its usefulness is well established.

The above books can be procured from J. H. Chambers & Co., 914 Locust Street, St Louis, Mo.

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